Modular PLC Series CQM1H

General

The SYSMAC CQM1H redefines the modular structure of controllers with up to 512 inputs and outputs. In contrast to traditional modular controllers, it does not require a rack that establishes the space requirements in advance. The individual I/O Units are simply connected to the CPU Unit and snapped onto the DIN rail.

Programming is carried out via the programming interface and a PC using the CX-Programmer programming software.

PLC program written for the CQM1 are also compatible with the CQM1H.

For programming software, see page 434.

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Performance Data

	CQM1H–CPU11/–CPU21	CQM1H–CPU51	CQM1H–CPU61
Local inputs/outputs	256	512	512
Remote inputs/outputs	224	480	480
Execution time (bit instruction)	0.4 µs	0.4 µs	0.4 µs
Program memory	3.2 kwords	7.2 kwords	15.2 kwords
Data memory	3 kwords	6 kwords	12 kwords
Input interrupts	4	4	4
Time–controlled interrupts	3 (0.5 ms..5 min)	3 (0.5 ms..5 min)	3 (0.5 ms..5 min)
Special I/O Module	-	2 slots	2 slots

Networks and Communication

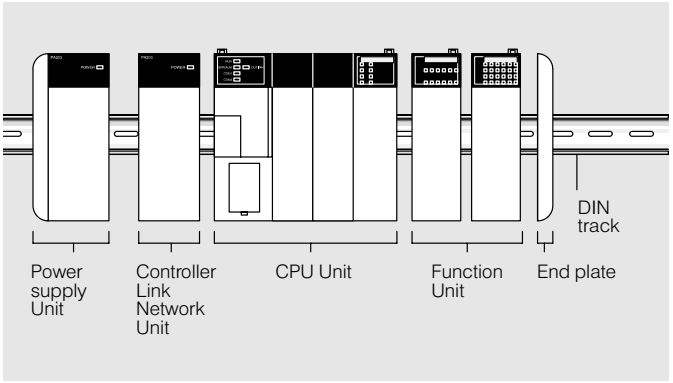
Networks, see page 213

Ethernet (open network)	-	-	-
Controller Link (network)	-	Yes	Yes
Host Link SYSMAC WAY (network)	Yes	Yes	Yes
DeviceNet (open fieldbus)	Yes (slave)	Yes (slave)	Yes (slave)
CompoBus/S (fieldbus)	Yes	Yes	Yes
ASI–Interface (open fieldbus)	Yes	Yes	Yes
PROFIBUS–DP (open fieldbus)	Yes (slave)	Yes (slave)	Yes (slave)

System Configuration

The individual Units of the CQM1H system are plugged in to one another and secured using 2 locking sliders. The system must be mounted on a DIN rail.

To make installation easier, the I/O Unit terminal blocks can be removed.



The following information should be noted when selecting I/O Units:

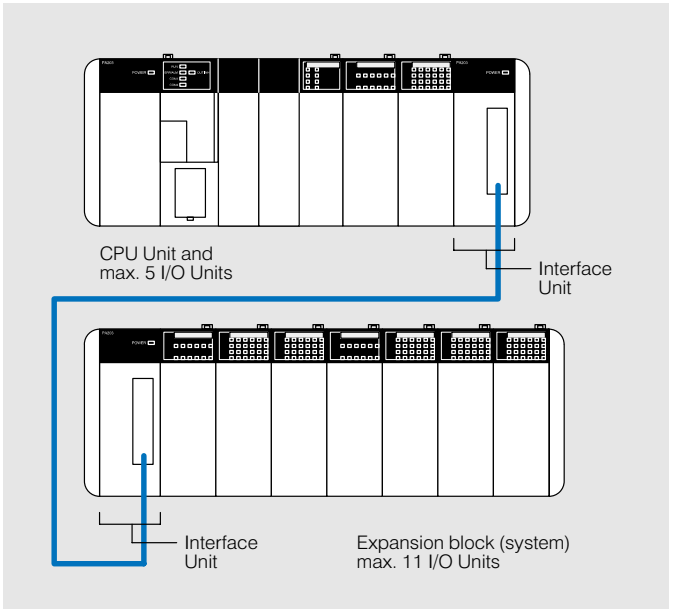
CPU type	Number of free I/O*	Max. number of Units*
CQM1H-CPU11/-CPU21	240 (15 words)	11
CQM1H-CPU51/-CPU61	496 (31 words)	11 (5+11 with exp.)

* Excluding the 16 transistor inputs integrated into the CPU

I/O expansion

It is possible to expand the CQM1H system by one I/O Unit block (system) using interface units and a bus cable. This allows a maximum configuration of 5 I/O Units on the CPU and 11 I/O Units on the expansion block (system) to be achieved.

The power consumption of all CPU Units may not exceed 3.0 A and that of the Expansion Block (system) Units may not exceed 2.0 A.

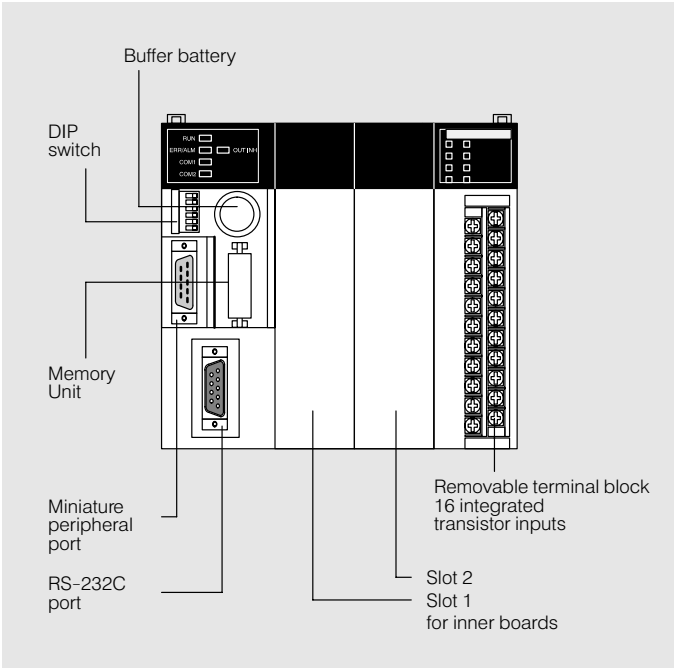


Special features of the CQM1H CPU

Each CPU has 16 transistor inputs. Four of these inputs can be configured as interrupt inputs. The response time before the interrupt subroutine is called up is max. 0.1 ms.

Furthermore, three inputs can be used to connect an encoder as a high-speed counter input. Pulses of up to 5 kHz are counted.

Each CQM1H CPU can output pulses up to 1 kHz via a Transistor Output Unit.

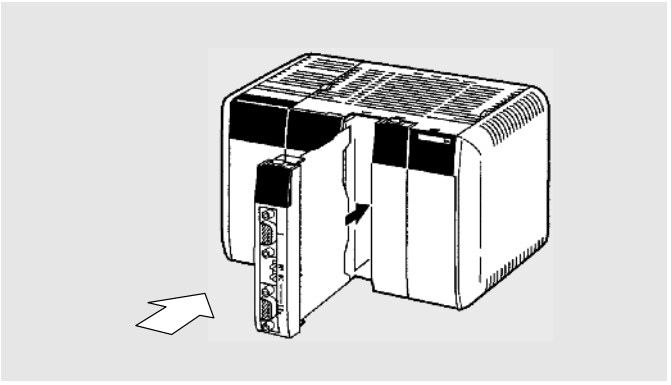


System Configuration (Continued)

Inner Boards

A further special feature of the CQM1H CPU51/CPU61 is slots 1 and 2.

Slots 1 and 2 can hold inner boards with various functions. It should be noted that some inner boards may only be used in slot 1 and others may only be used in slot 2.



Protocol macro function

The special I/O Module CQM1H-SCB41 with one RS-232C and one RS-422/485 port supports the protocol macro function.

This function provides a simple method of generating transmission protocols for other devices, such as a modem, barcode reader or printer. Using the CX-Protocol software, ASCII character strings can be assigned to different sequence numbers. The PLC program only has to call up the sequence number.

The reference data for the response can be automatically filtered.

For CX-Protocol software, see page 438.

CPU Units

CPU Unit
- Peripheral port
- 16 built-in transistor inputs

Model code	CQM1H-CPU11
Local I/O	256
Program memory	3.2 kwords
Data memory	3 kwords
Current consumption	820 mA

CPU Unit
- Peripheral port
- RS-232C port
- 16 built-in transistor inputs

Model code	CQM1H-CPU21
Local I/O	256
Program memory	3.2 kwords
Data memory	3 kwords
Current consumption	820 mA

CPU Unit
- Peripheral port
- RS-232C port
- Controller Link – network capable
- Inner boards possible
- 16 integrated transistor inputs

Model code	CQM1H-CPU51
Local I/O	512
Program memory	7.2 kwords
Data memory	6 kwords
Current consumption	820 mA

CPU Unit
- Peripheral port
- RS-232C port
- Controller Link – network capable
- Inner boards possible
- 16 integrated transistor inputs

Model code	CQM1H-CPU61
Local I/O	512
Program memory	15.2 kwords
Data memory	12 kwords
Current consumption	820 mA

Specifications (CPU Units)

Designation	CQM1H	CPU11	CPU21	CPU51	CPU61
CPU integrated I/O		16 inputs 1 circuit	16 inputs 1 circuit	16 inputs 1 circuit	16 inputs 1 circuit
Max. local I/O		256	256	512	512
Max. remote I/O		224	224	480	480
Execution time	µs	0.4	0.4	0.4	0.4
Real-time clock		Via Memory Module CQM1-M_			
Number of I/O Units		11	11	11 15 with interface unit	11 15 with interface unit
Program memory	kwords	3.2	3.2	7.2	15.2
Data words	kwords	3	3	6	12
Auxiliary relay	bits (words)	3808 (238)	3808 (238)	3808 (238)	3808 (238)
Holding relay	bits (words)	1600 (100)	1600 (100)	1600 (100)	1600 (100)
Timer/Counter		512	512	512	512
CPU ports		- Peripheral: RS-232C switchable with DIP switch 7, RS-422 via adapter	- Peripheral: RS-232C switchable with DIP switch 7, RS-422 via adapter - RS-232C	- Peripheral: RS-232C switchable with DIP switch 7, RS-422 via adapter - RS-232C	
I/O refresh method		Combination of cyclic scan with direct output and immediate refresh processing methods.		Combination of cyclic scan with direct output and immediate refresh processing methods.	
Number of instructions		14 basic, 103 special instructions with edge triggered execution		14 basic, 123 special instructions with edge triggered execution	
Special instructions		- Pulse output - Scaling, SIN/COS - I/O refresh - Interpolation - Macro - 7 segment decoder - 10/16 key scan - Subroutines - Indirect addressing		- Floating point arithmetic - PID control - Pulse output - Scaling - ASCII/HEX,SIN/COS - Interpolation - Table compare instructions - Arithmetic - Macro - 7 segment decoder - 10/16 key scan - Subroutine - I/O refresh - Indirect addressing	
Trace memory		-		Yes	
Data backup		Battery		Battery	
Program backup		Battery or Memory Module CQM1H-ME_ (5 years, at 25°C)		Battery or Memory Module CQM1-ME_ (5 years, at 25°C)	
Program protection		Password		Password	
Pulse output		1 (1 kHz)		1 (1 kHz)	
Pulse counter		1 (5 kHz)		1 (5 kHz)	
Input interrupts		4 (pulse width 0.1 ms)		4 (pulse width 0.1 ms)	
Counter interrupts		3 (1 kHz)		3 (1 kHz)	
Time-controlled interrupts		3 (0.5 ms..5 min)		3 (0.5 ms..5 min)	

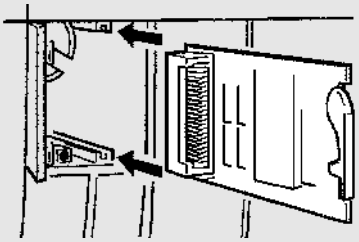
General Data (CPU and Power Supply Units)

Vibration resistance	10..57 Hz, 0.075 mm Amplitude, 57..100 Hz with an acceleration of 1 G in X, Y and Z directions each 10 sweeps of 8minutes
Shock resistance	15 G (12 G for contact outputs) in X, Y and Z directions, 3 times respectively
Temperature Operation Storage	0 °C..55 °C -20 °C..75 °C (without battery)
Ambient humidity	10%..90% (without condensation)
Atmosphere	Controller must not be exposed to the following conditions: – Corrosive gases – Severe temperature fluctuations – Air with an extreme dust and salt content – Metal filings or metallic dust – Splash water – Other chemicals
Degree of protection	IEC IP30 (Control cabinet mounting)
Grounding	According to EN60204
Insulation resistance	20 MΩ at 500 VDC, between AC terminal and GR terminal
Dielectric strength	2300 VAC; 50/60 Hz for 1 minute between AC terminal and housing, Leakage current: max. 10 mA 1000 VAC; 50/60 Hz for 1 minute between DC terminal and housing, Leakage current: max. 20 mA
Noise immunity Pulse duration Rise time	1500 Vss 100 ns..1 µs 1 ns

Memory Module (CPU Units)

The Memory Modules can be used to load the user program to the PLC. This allows independence from the life of the buffer battery. It does not represent a memory expansion.

When the PLC power supply is turned on, the content of the Memory Module is copied to the RAM area.



Memory Module

Memory Modules	Description	Size	Model code
	Flash ROM	16 kwords – With hardware clock	**CQM1H–ME16K** **CQM1H–ME16R**
	EPROM Module	Memory Module without IC – With hardware clock	**CQM1–MP08K** **CQM1–MP08R**
	– EPROM-IC	16 kwords, 150 ns, 27256 32 kwords, 150 ns, 27512	**ROM–JD–B** **ROM–KD–B**